



GHANA WHOLESAL ELEC TRICIT Y MARKET BULLETIN

MARKET WATCH

Monthly Market Data Analysis

ISSUE NO. 49

1st January 2020 to 31st January 2020

This Bulletin covers major developments in the Wholesale Electricity Market (WEM) of Ghana from 1st January 2020 to 31st January 2020. It analyses the performance of the key WEM indicators against their benchmarks and examines the likely implications of any discernable trends in the market. This edition of the WEM bulletin analysis the electricity supply outlook for Ghana for 2020.

The Electricity Market Oversight Panel (EMOP) would very much appreciate and welcome comments from readers on the Bulletin. Reasonable care has been taken to ensure the information contained in this Bulletin is accurate at the time of publication, nevertheless, any errors, omissions, or inaccuracies therein are regretted.

HIGHLIGHTS OF THE MONTH

A marginal growth of 0.7% in the System Peak Load was recorded from December 2019 to January 2020. The increase in the System Peak Load was from 2,881.2 MW in December 2019 to 2,900.4 MW in January 2020. On the contrary, there was a reduction of 0.5% in the Ghana Peak Load in January 2020, from 2,553.2 MW in December 2019 to 2,539.5 MW. The System Peak Load recorded in January 2020 was 0.6% marginally lower than the 2,919 MW projected in the 2020 Electricity Supply Plan (ESP). Also, the Ghana Peak Load recorded in January 2020 was 1.9% lower than the 2,589 MW projected in the ESP for 2020. There was 408 MW exported to CIE, CEB, and SONABEL at the System Peak Load which was 23.6% higher than the 330 MW projected in the 2020 ESP. However, there was no electricity import at the System Peak Load for January 2020. The average electricity demand of 2,260.87 MW was recorded in January 2020 which was 4% higher than the 2,173.25 MW projected in the 2020 ESP.

There was a marginal increase of 0.01% in the total electricity supplied in January 2020, from 1,681.97 GWh in December 2019 to 1,682.09 GWh. Also, the total electricity supplied in January 2020 was 4% higher than the 1,616.9 GWh projected in the 2020 ESP. A total of 1,497.65 GWh of electricity was consumed domestically in January 2020 was 2.7% higher than the 1,458.9 GWh projected in the 2020 ESP. A total of 184.44 GWh of electricity was exported to CIE, CEB, and SONABEL in January 2020, which was 16.7% higher than the 158 GWh projected in the 2020 ESP.

The share of electricity generated from hydro

Table 1. Projected and Actual Outturn of electricity demand and supply in December 2019 and January 2020.

	January 2020		December 2019	
	Projected	Actual Outturn	Projected	Actual Outturn
Total Supply (GWh)	1,518.1	1,682.9	1,518.1	1,682.0
Source by Power Plants (GWh)				
AKOSOMBO	495.0	497.9	377.1	400.2
KPONG	63.0	63.4	67.6	67.1
BUI	81.0	81.3	55.2	121.8
Sunon Asogli	149.0	150.0	173.1	229.4
TAPCO	91.0	89.9	150.4	112.2
TICO	100.0	98.9	202.4	192.3
TT1PP	38.0	38.2	55.0	66.6
CENIT	46.0	45.4	-	79.3
TT2PP	5.0	5.4	-	17.3
Amandi	-	14.4	-	69.8
Karpowership	248.0	252.3	256.7	171.6
AMERI	134.0	134.9	33.7	81.4
RTPP	10.0	8.1	-	10.9
Trojan Power	-	-	-	-
CENPOWER	59.0	61.1	-	-
AKSA	93.0	93.7	142.0	25.2
Bridge Power	-	1.4	-	1.4
BXC Solar	2.0	2.2	2.3	2.8
Safisana	-	-	-	-
VRA Solar	0.3	0.3	0.3	0.3
Genser	-	38.9	-	36.5
Meinergy	2.0	2.0	2.3	2.4
Total Generation (GWh)	1,616.3	1,679.6	1,518.1	1,681.7
Imports (GWh)	-	3.3	-	1.6
Total Supply (GWh)	1,616.3	1,682.9	1,518.1	1,683.3
Deficit/Over supply (GWh)	-	66.6	-	163.9
Ghana Coincided Peak Load (MW)	2,589.0	2,539.5	2,721.0	2,553.2
System Coincided Peak Load (MW)	2,919.0	2,900.4	2,881.0	2,881.2

HIGHLIGHTS OF THE MONTH

sources increased from 35% in December 2019 to 38.2% in January 2020 in the total electricity supplied. Consequently, the share of the total electricity supplied from thermal sources reduced from 64.6% in December 2019 to 61.5% in January 2020. Electricity generated from renewable energy continues to form 0.3% of the total electricity supplied in January 2020.

The rate of reduction in the water level for the Akosombo GS increased by 33.3%, whilst the rate of reduction in the water level for the Bui GS reduced by 22.2% in January 2020. The rate of reduction in the Akosombo GS increased from 0.04 feet per day in December 2019 to 0.05 feet per day in January 2020. The rate of reduction in the water level for the Bui GS reduced from 0.16 feet per day in December 2019 to 0.13 feet per day in January 2020.

The share of the total natural gas consumed continued to dominate the total fuel mix in January 2020, from 92.3% in November 2019, 92.2% in December 2019 to 85.3%. Therefore, the share of the total liquid fuel consumed constituted 14.7% of the total fuel mix, which was higher than the 7.8% recorded in December 2019.

ELECTRICITY DEMAND AND SUPPLY

Electricity Demand

There was a marginal increase of 0.7% in the System Peak Load recorded for January 2020, from 2,881.2 MW in December 2019 to 2,900.4 MW. On the other hand, there was a marginal reduction of 0.5% in the Ghana Peak Load recorded in January 2020, from 2,553.2 MW in December 2019 to 2,539.5 MW. There was no electricity import during the System Peak Load in January 2020. A total of 408 MW of electricity was exported to CIE, CEB, and SONABEL during the System Peak Load in January 2020. Out of the total electricity exported, 34 MW was supplied to CIE, 239 MW to CEB, and 135 MW to SONABEL in January 2020. Electricity generated from hydro sources contributed 45.3% of the System Peak Load and 41.1% of the Ghana Peak Load. The remaining 54.7% of the System Peak Load and 58.9% of the Ghana Peak Load was supplied from thermal sources. Average electricity demand increased marginally by 0.01%, from 2,260.71 MW in December 2019 to 2,260.87 MW in January 2020. On the contrary, the System Load factor reduced from 76.5% in December 2019 to 75.9% in January 2020.

Electricity supply

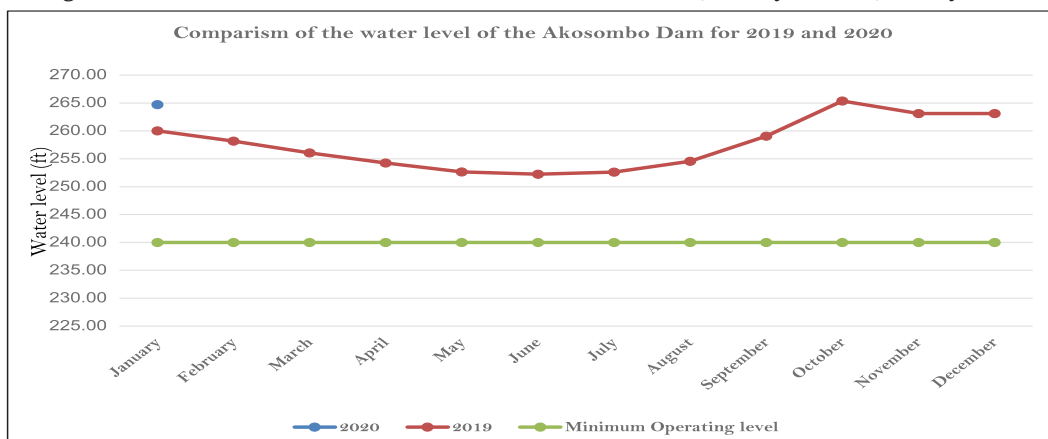
The average electricity supplied in January 2020 increased marginally from 54.257 GWh per day in December 2019 to 54.261 GWh per day. Similarly, the total electricity supplied in January 2020 increased from 1,681.97 GWh in December 2019 to 1,682.09 GWh. The total electricity supplied in January 2020 constituted 3.33 GWh of import from CIE and the remaining 1,678.76 GWh from domestic sources. A total of 184.44 GWh was exported to CIE, CEB, and SONABEL in January 2020. Out of the total electricity exported, 25.3 GWh was supplied to CIE, 101.03 GWh was supplied CEB, and the remaining 58.12 GWh to SONABEL. Electricity generated from hydro sources contributed 38.2% of the total electricity supplied in January 2020, which was higher than the contribution of 35% in December 2019. The thermal generation contributed 61.5% of the total electricity supplied in January 2020, which was lower than the 64.6% it supplied in December 2019. The remaining energy of 0.3% was supplied from renewable energy sources.

HYDRO DAM LEVELS

Akosombo Dam Water Level continued to drop in January 2020

The Akosombo dam recorded an increase in the rate of drop in the water level by 33.3%, from 0.04 feet per day in December 2019 to 0.05 feet per day in January 2020. The water level of 264.72 feet recorded at the beginning of the month dropped by 1.6 feet to 263.12 feet at the end of the month. The water level recorded at the end of January 2020 was 3.12 feet above the water level recorded for the same period in 2019. Also, the water level recorded at the end of January 2020 was 23.12 feet above the minimum operating water level of the dam.

Figure 1: Month-End Water Level for Akosombo Dam from January 2019 to January 2020.



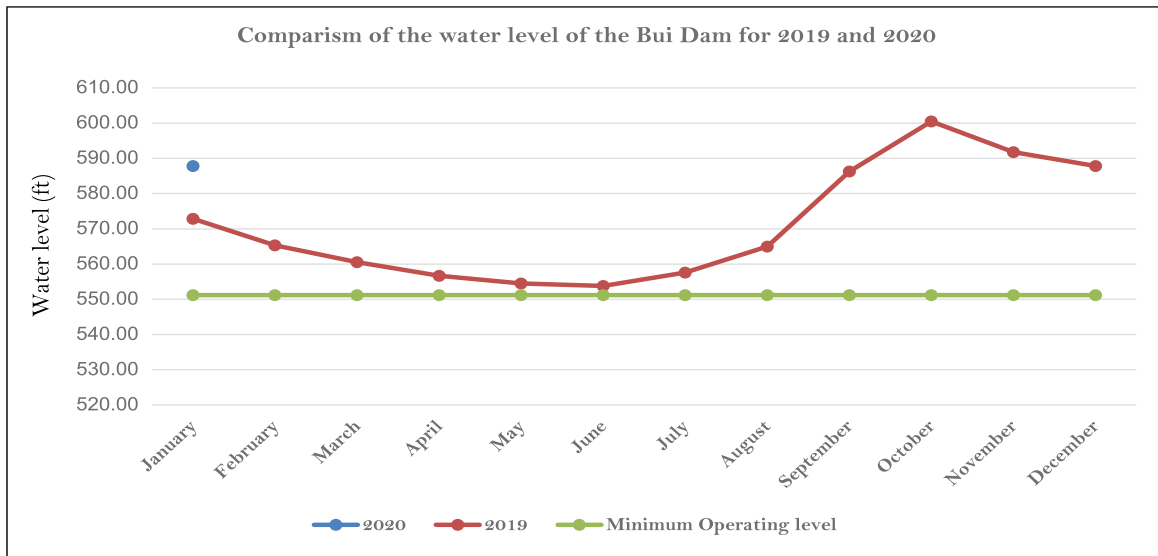
HIGHLIGHTS OF THE MONTH

Bui Dam Water Level continued to drop in January 2019

The Bui dam water level continued to drop but at a reduced rate from 0.16 feet per day in December 2019 to 0.13 feet per day in January 2020. The water level of 591.76 feet recorded at the beginning of the month reduced by 3.9 feet to a month-end water level of 557.86 feet. The water level recorded at the end of the month was 15.03 feet above the water level recorded for the same period in 2019. Also, the water level recorded at the end of the month was 36.68 feet above the minimum operating water level for the dam.

Figure 2 shows the comparative end of month trajectory of the level of water in the Bui dam from January 2019 to January 2020.

Figure 2: Month-End Water Level for Bui Dam from January 2019 to January 2020



FUEL SUPPLY FOR POWER GENERATION

Natural gas import (WAGPCo) increased in January 2020

The natural gas flow rate from the West Africa Gas Pipeline Company (WAGPCo) increased marginally by 2.7%, from 61.79 MMSCFD in December 2019 to 63.5 MMSCFD in January 2020. Consequently, the total natural gas supplied by WAGPCo increased from 1,915.61 MMSCF in December 2019 to 1,968.56 MMSCF in January 2020. The share of the total natural gas supplied by WAGPCo increased in the total natural gas consumed from 21.2% in December 2019 to 26.5% in January 2020. Similarly, the share of the total natural gas supplied by WAGPCo in the total fuel mix was 23% in January 2020.

Natural gas supply from Domestic sources increased in January 2020

The natural gas flow rate from the Atuabo Gas Processing Plant to the Aboadze Power Enclave was recorded at 44.75 MMSCFD in January 2020. Also, the natural gas flow rate from ENI/GNPC to the Aboadze Power Enclave decreased from 60.46 MMSCFD in December 2019 to 48.78 MMSCFD in January 2020. A total of 5,640.74 MMSCF in January 2020, which was lower than the 5,920.9 MMSCF recorded in December 2019. The total natural gas supplied from domestic sources contributed 73.5% of the total natural gas consumed and 63.6% of the total fuel mix in January 2020.

Liquid Fuel

There was a significant increase in the total liquid fuel consumed by 58.6%, from 136,066 barrels in December 2019 to 215,859 barrels in January 2020. The increase in liquid fuel consumption was largely due to the generation from AKSA. The share of HFO in the total liquid fuel consumed increased from 39.3% in December 2019 to 61.6% in January 2020. In the total fuel mix, the share of HFO increased from 3.1% in December 2019 to 8.4% in January 2020. On the contrary, the share of the total LCO consumed in the total liquid fuel decreased from 60.7% in December 2019 to 24.7% in January 2020. Similarly, the share of LCO in the total fuel mix decreased from 4.7% in December 2019 to 3.3% in January 2020. DFO consumption contributed 13.7% of the total liquid fuel consumed and 1.9% of the total fuel mix in January 2020.

Plant by Plant Highlights

Electricity Generation at the Akosombo Generation Station (GS) increased in January 2020

The average electricity generated by the Akosombo GS increased by 24.4%, from 12.91 GWh per day in December 2019 to 16.06 GWh per day in January 2020. Similarly, the total electricity supplied by the hydropower plant increased from 400.18 GWh in

HIGHLIGHTS OF THE MONTH

December 2019 to 497.89 GWh in January 2020. The significant increase in the total electricity supplied by the Akosombo GS was to make up for supply shortfalls due to natural gas supplied challenges from GNGC to power plants in the Aboadze power enclave. The total electricity supplied by the hydropower plant constituted 29.6% of the total electricity supplied in January 2020 and was 0.6% more than the 495 GWh projected in the 2020 ESP. The Akosombo GS contributed a total of 913.2 MW to both the System Peak Load and the Ghana Peak Load in January 2020. This translates into 31.5% of both peak loads.

Electricity supply by Kpong Generation Station (GS) decreased in January 2020

There was a reduction of 5.6% in the average electricity generated by the Kpong GS in January 2020, from 2.17 GWh per day in December 2019 to 2.05 GWh per day. Likewise, the total electricity supplied by the Kpong GS decreased from 67.14 GWh in December 2019 to 63.4 GWh in January 2020. The total electricity supplied by the hydropower plant contributed 3.8% of the total electricity supplied in January 2020. The hydropower plant contributed 39 MW to the System Peak Load and 36 MW to the Ghana Peak Load in January 2020. This represents 1.3% of the Ghana Peak Load and 1.2% of the Ghana Peak Load.

Electricity supply by the Bui Generation Station (GS) decreased in January 2020.

The Bui GS continued to record a reduction in its generation from 7.23 GWh per day in November 2019 to 3.93 GWh per day in December 2019 to 2.62 GWh per day in January 2020. Similarly, the total electricity supplied by the Bui GS decreased by 33.3%, from 121.84 GWh in December 2019 to 81.33 GWh in January 2020. The total electricity generated by the hydropower plant contributed 4.5% of the total electricity supplied in January 2020 and was 0.4% higher than the 81 GWh projected in the 2020 ESP. The hydropower plant contributed 361.7 MW to the System Peak Load and 241.7 MW of the Ghana Peak Load. This translates into 12.4% of the System Peak Load and 8.3% of the Ghana Peak Load in January 2020.

Generation by the Sunon Asogli Power Plant (SAPP) decreased in January 2020

There was a reduction in the average electricity supplied by the Sunon Asogli Power Plant in January 2020, from 7.4 GWh per day to 4.84 GWh per day. Similarly, the total electricity supplied by SAPP decreased by 34.6%, from 229.35 GWh in December 2019 to 149.98 GWh in January 2020. The total electricity generated by the thermal power plant constituted 8.9% of the total electricity supplied in January 2020 and was 0.7% higher than the 149 GWh projected in the 2020 ESP. The thermal power plant contributed 360.2 MW to the System Peak Load and 361.7 MW to the Ghana Peak Load. This represents 12.4% of the System Peak Load and 12.5% of the Ghana Peak Load in January 2020. A total of 1,143.58 MMSCF of natural gas was consumed by SAPP at an estimated heat rate of 8,139.37 Btu/kWh in January 2020 which was lower than the 8,290.46 Btu/kWh recorded in December 2019.

Ameri Energy Power Plant's generation increased in January 2020

There was a significant increase in the electricity generated by the Ameri power plant by 65.7% in January 2020. The average electricity generated by the Ameri power plant increased from 2.63 GWh per day in December 2019 to 4.35 GWh per day in January 2020. Similarly, the total electricity supplied by the thermal power plant increased from 81.42 GWh in December 2019 to 134.87 GWh in January 2020. The total electricity supplied by the thermal power plant contributed 8% of the total electricity supplied in January 2020 and was 0.7% higher than the 134 GWh projected in the 2020 ESP. The Ameri power plant contributed 191.4 MW to the System Peak Load and 189.3 MW to the Ghana Peak Load, representing 6.6% and 6.5% of the peak loads respectively in January 2020. The thermal power plant consumed a total of 1,230.39 MMSCF of natural gas at an estimated heat rate of 10,272.91 Btu/kWh in January 2020, which was higher than the 10,177.58 Btu/kWh recorded in December 2019.

The Karpowership Power Plant's generation increased in January 2020

There was a significant increase in the total electricity supplied by Karpowership by 47% in January 2020. The average electricity supplied by the thermal power plant increased from 5.54 GWh per day in December 2019 to 8.14 GWh per day in January 2020. The total electricity supplied by the thermal power plant increased from 171.6 GWh in December 2019 to 252.26 GWh in January 2020. The Karpowership's total electricity generated constituted 15% of the total electricity supplied in January 2020 and was 1.7% higher than the 248 GWh projected in the 2020 ESP. The thermal power plant contributed 416.3 MW and 416.6 MW to the System Peak Load and the Ghana Peak Load respectively in January 2020. This translates into 14.4% of both peak loads. The Karpowership operated fully on natural gas in January 2020. A total of 1,792.59 MMSCF of natural gas was consumed by the thermal power plant at an estimated heat rate of 7,823.94 Btu/kWh in January 2020, which was lower than the 8,056.91 Btu/kWh recorded in December 2019.

AKSA Power Plant's generation increased in January 2020

The AKSA power plant recorded a significant increase of about 2.7 folds in the electricity generated in January 2020. The average electricity generated by the thermal power plant increased from 0.81 GWh per day in December 2019 to 3.02 GWh per day in January 2020. Similarly, the total electricity supplied by the thermal power plant increased from 25.19 GWh in December 2019 to 93.06 GWh in January 2020. The total electricity generated by the AKSA power plant contributed 5.6% of the total electricity supplied in January 2020 and was 0.7% higher than the 93 GWh projected in the 2020 ESP. AKSA contributed 250 MW and 109.7 MW to the System Peak Load and the Ghana Peak Load respectively in January 2020. This translates into 8.6% of the System Peak Load and 3.7% of the Ghana Peak Load. The thermal power plant consumed a total of 126,314 barrels of HFO at an estimated heat rate of 8,158.96 Btu/kWh in January 2020, which was marginally higher than the 8,156 Btu/kWh recorded in December 2019.

Takoradi International Company (TICO) generation decreased in January 2020

The average electricity generated by TICO reduced by 48.5%, from 6.2 GWh per day in December 2019 to 3.19 GWh in January 2020. Similarly, the total electricity generated by the thermal power plant reduced from 192.25 GWh in December 2019 to 98.93 GWh in January 2020. The total electricity generated by TICO constituted 5.9% of the total electricity supplied in January 2020 and was 1.1% lower than 100 GWh projected in the 2020 ESP. TICO generated a total of 109 MW to both the System Peak Load and the Ghana Peak Load, representing 3.8% of both peak loads in January 2020. The thermal power plant consumed a total of 824.06 MMSCF of natural gas at an estimated heat rate of 9,379.16 Btu/kWh in January 2020, which was higher than the 8,407.8 Btu/kWh recorded in December 2019.

Takoradi Power Company (TAPCO) Plant's generation decreased in January 2020

The average electricity generated by TAPCO decreased by 19.9%, from 3.62 GWh per day in December 2019 to 2.9 GWh per day in January 2020. The total electricity supplied by TAPCO decreased from 112.22 GWh in December 2019 to 89.86 GWh in January 2020. The total electricity generated by the thermal power plant constituted 5.3% of the total electricity supplied in January 2020 and was 1.3% lower than the 91% projected in the 2020 ESP. The thermal power plant did not contribute to the System Peak Load but contributed

HIGHLIGHTS OF THE MONTH

28.4 MW to the Ghana Peak Load, representing 1% of the Ghana Peak Load in January 2020. A total of 1,084.13 MMSCF of natural gas was consumed by the thermal power plant at an estimated heat rate of 8,433.12 Btu/kWh in January 2020, which was higher than the 8,192.77 Btu/kWh recorded in December 2019.

Cenpower Plant generated in January 2020

The Cenpower plant operated in January 2020 and supplied a total of 61.06 GWh. The total electricity generated by the thermal power plant constituted 2% of the total electricity supplied in January 2020. The Cenpower plant was projected to supply 59 GWh in January 2020 but generated 3.4% more. The thermal power plant contributed 120 MW to the System Peak Load and 110 MW to the Ghana Peak Load, this translates into 4.1% of the System Peak Load and 3.8% of the Ghana Peak Load in January 2020. A total of 126.59 MMSCF of natural gas, 59,032 barrels of LCO, and 14,875 barrels of DFO were consumed by the Cenpower plant at an estimated heat rate of 8,645.8 Btu/kWh in January 2020.

Kpone Thermal Power Plant (KTPP) generation decreased in January 2020

KTPP operated for 9 days in January 2020 and generated a total of 8.08 GWh. The total electricity generated constituted 0.5% of the total electricity supplied in January 2020 and was 19.2% lower than the 10 GWh projected in the 2020 ESP. The thermal power plant did not contribute to both the System Peak Load and the Ghana Peak Load in January 2020. The thermal power plant consumed a total of 14,025 barrels of DFO at an estimated heat rate of 9,317.73 Btu/kWh in January 2020.

Tema Thermal 1 Power Plant's (TT1PP) generation decreased in January 2020

TT1PP operated for 15 days in January 2020 and supplied a total of 38.24 GWh which constituted 2.7% of the total electricity supplied in January 2020. The total electricity generated by the thermal power plant was 0.6% higher than the 38 GWh projected in the 2020 ESP. The thermal power plant did not contribute to both the System Peak Load and the Ghana Peak Load in January 2020. The thermal power plant consumed a total of 457.7 MMSCF of natural gas at an estimated heat rate of 12,776.54 Btu/kWh in January 2020.

CENIT Power Plant's generation decreased in January 2020

The CENIT power plant continued its operations in January 2020 but for only the first 20 days. The thermal power plant supplied a total of 45.4 GWh in January 2020 which was 42.9% lower than the 79.51 GWh supplied in December 2019. The total electricity supplied by CENIT contributed 2.7% of the total electricity supplied in January 2020 and 1.3% lower than the 46 GWh projected in the 2020 ESP. The thermal power plant contributed 106 MW and 107 MW to the System Peak Load and the Ghana Peak Load respectively in January 2020. This represents, 3.7% of both peak loads. A total of 460.07 MMSCF of natural gas was consumed by the thermal power plant at an estimated heat rate of 11,156.5 Btu/kWh in January 2020, which was lower than the 11,167.31 Btu/kWh recorded in December 2019.

Embedded Electricity Generation

Genser Power Plant's generation increased in January 2020

There was an increase of 6.7% in the average electricity supplied by Genser in January 2020, from 1.18 GWh per day in December 2019 to 1.26 GWh per day. Similarly, the total electricity supplied by the thermal power plant increased from 36.48 GWh in December 2019 to 38.94 GWh in January 2020. The total electricity supplied by the thermal power plant constituted 2.3% of the total electricity supplied in January 2020. The Genser power plant consumed a total of 388.15 MMSCF of natural gas at an estimated heat rate of 11,223.74 Btu/kWh in January 2020, which was higher than the 11,138.41 Btu/kWh recorded in December 2019.

BXC Solar generation decreased in January 2020

There was a 20.8% decrease in the total electricity supplied by the BXC solar power plant in January 2020, from 2.83 GWh in December 2019 to 2.24 GWh. The total electricity supplied by the solar power plant constituted 0.1% of the total electricity supplied in January 2020 and was 2.6% lower than the 2.3 GWh projected in the 2020 ESP.

VRA Navrongo Solar's generation decreased in January 2020

The VRA Navrongo solar power plant recorded an 8.2% decrease in the total electricity supplied in January 2020, from 0.32 GWh in December 2019 to 0.29 GWh. The total electricity supplied by the VRA solar power plant constituted 0.02% of the total electricity supplied in January 2020 and was 3.3% lower than the 0.3 GWh projected in the 2020 ESP.

Meinergy Solar generation decreased in January 2020

The total electricity supplied by the Meinergy solar power plant reduced by 16.5% in January 2020, from 2.41 GWh in December 2019 to 2.01. The total electricity supplied by the solar power plant constituted 0.1% of the total electricity supplied in January 2020 and was 12.5% lower than the 2.3 GWh projected in the 2020 ESP.

Electricity Exchange – Import decreased whilst Export increased in November 2019

The average electricity import from CIE increased in January 2020 by over a fold, from 0.05 GWh per day in December 2019 to 0.11 GWh per day. Similarly, the total electricity imported from CIE increased from 1.6 GWh in December 2019 to 3.33 GWh in January 2020. The total electricity imported constituted 0.2% of the total electricity supplied in January 2020.

On average, the average electricity exported to CIE, CEB, and SONABEL decreased by 1.3% in January 2020, from 6.03 GWh per day in December 2019 to 5.95 GWh per day. There was a reduction in the average electricity exported to CIE and CEB by 8.8% and 0.7% respectively in January 2020. The average electricity export to CIE and CEB decreased from 0.9 GWh per day and 3.28 GWh per day in December 2019 to 0.82 GWh per day and 3.26 GWh per day in January 2020 respectively. On the contrary, the average electricity supplied to SONABEL increased by 1.4%, from 1.85 GWh per day in December 2019 to 1.88 GWh per day in January 2020.

The total electricity export to CIE, CEB, and SONABEL decreased from 186.83 GWh in December 2019 to 184.44 GWh in January 2020. The total electricity export to CIE and CEB decreased from 27.74 GWh and 101.78 GWh in December 2019 to 25.3 GWh and 101.03 GWh in January 2020 respectively. On the contrary, the total electricity export to SONABEL increased from 57.31 GWh in December 2019 to 58.12 GWh in January 2020.

Ghana continued to be a net exporter of electricity in January 2020.

OPERATIONAL FACT SHEET

Monthly Market Data Analysis

Figure 3a: Shares of sources of fuel in total fuel mix for power generation Figure 3b: Shares of fuel type in the generation fuel mix power generation

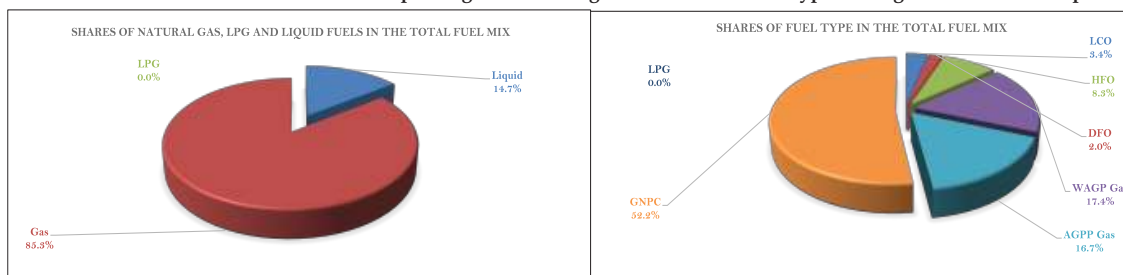
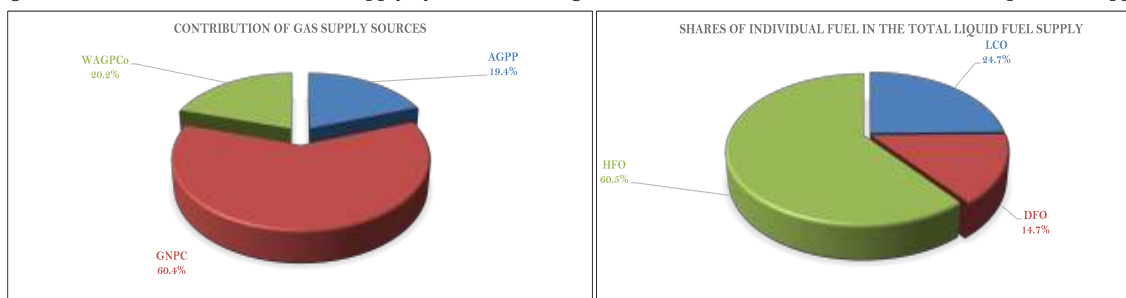


Figure 4a: Contribution of Natural Gas Supply by sources

Figure 4b: Contribution of individual fuel in the liquid fuel supply

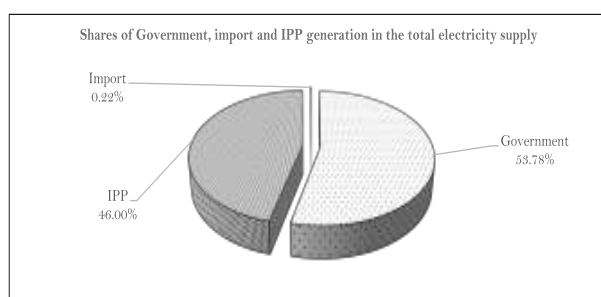
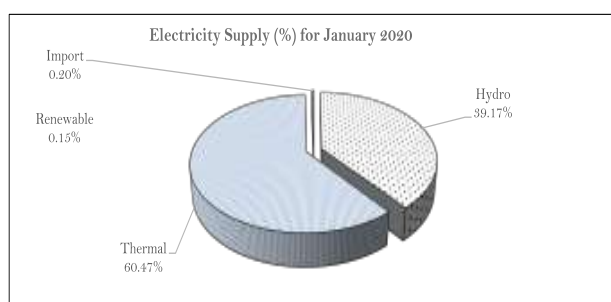


Peak Electricity Supply - January 2020			
Source of Supply	Generation at System Peak Load (MW)	Generation at Ghana Peak Load (MW)	Electricity Supply (GWh)
AKOSOMBO	913.20	913.20	497.89
KPONG	39.00	36.00	63.40
BUI	361.70	241.70	81.33
SEAP	360.20	361.70	149.98
TAPCO	-	28.40	89.86
TICO	109.00	109.00	98.93
TT1PP	-	-	38.24
CENIT	106.00	107.00	45.40
TT2PP	13.00	13.00	5.42
MRP	20.60	198.90	14.35
KARPOWER	416.30	416.60	252.26
AMERI	191.40	189.30	134.87
KTPP	-	-	8.08
Trojan Power	-	-	-
CENPOWER	120.00	110.00	61.06
AKSA	250.00	109.70	93.66
BXC Solar	-	-	1.37
Safisana	-	-	2.24
VRA Solar	-	-	-
Genser	-	-	0.29
IMPORT	2,900.40	2,834.50	38.94
Export to CIE at peak	34.00	23.00	2.01
Export to CEB at peak	239.00	150.00	3.33
Export to Sonabel	135.00	122.00	1,682.90
System Coincident Peak Load	2,900.40		
Ghana Coincident Peak Load		2,539.50	
Total Supply			1,677.56
Total Supply without export			(10.68)

OPERATIONAL FACT SHEET

Average Monthly Flowrate (MMSCFD)	
Location	Monthly Average
Etoki	65.58
Tema WAGPCo	90.62
Aboadze WAGPCo	0.00
Aboadze GNGC	77.06
Reverse Flow	31.57

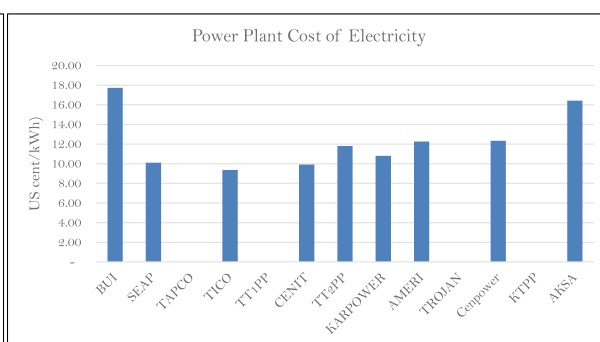
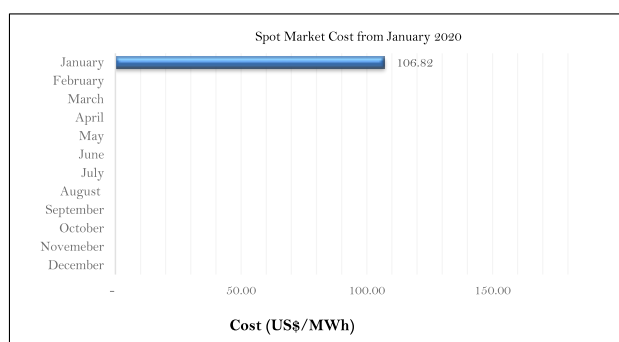
Jan-20			
	Beginning month (ft)	End month (ft)	Change in water level (feet)
Hydro Dam			
Akosombo	264.72	263.12	-1.60
Bui	591.77	587.86	-3.90



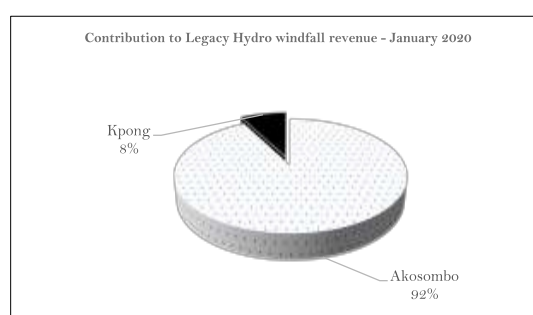
Power Plant Data January 2020								
	Installed Capacity (MW)	Plant Capacity Utilization (%)	Electricity Generation (GWh)	Gas Consumption (MMBtu)	LCO Consumption (MMBtu)	DFO Consumption (MMBtu)	HFO Consumption (MMBtu)	LPG Consumption (MMBtu)
Akosombo	1,020.00	65.61	497.89	-	-	-	-	-
Kpong	160.00	53.26	63.40	-	-	-	-	-
Bui	400.00	27.33	81.33	-	-	-	-	-
SEAP	560.00	36.00	149.98	1,220,726.35	-	-	-	-
TAPCO	330.00	36.60	89.86	757,072.74	-	-	-	-
TICO	340.00	39.11	98.93	927,889.77	-	-	-	-
TT1PP	126.00	40.79	38.24	488,574.93	-	-	-	-
CENIT	126.00	48.43	45.40	506,533.11	-	-	-	-
TT2PP	87.00	8.38	5.42	69,962.50	-	-	-	-
KARPOWER	470.00	72.14	252.26	2,026,680.02	-	-	-	-
AMERI	250.00	72.51	134.87	1,385,419.26	-	-	-	-
Cenpower	370.00	22.18	61.06	53,518.54	306,174.73	80,057.88	-	-
TROJAN	56.00	-	-	-	-	-	-	-
KTPP	220.00	4.94	8.08	-	-	90,999.37	-	-
AKSA	360.00	34.97	93.66	-	-	-	764,197.88	-
Amandi	-	-	14.35	142,675.56	-	-	-	-
Bridge Power	-	-	1.37	-	-	14,944.85	-	-
GENSER	95.00	55.09	38.94	437,052.38	-	-	-	-
VRA Solar	2.50	15.59	0.29	-	-	-	-	-
BXC	20.00	15.06	2.24	-	-	-	-	-
Meinergy	20.00	13.53	2.01	-	-	-	-	-
Total	5,012.50	45.04	1,679.58	8,016,105.14	306,174.73	186,002.09	764,197.88	-

ECONOMIC FACT SHEET

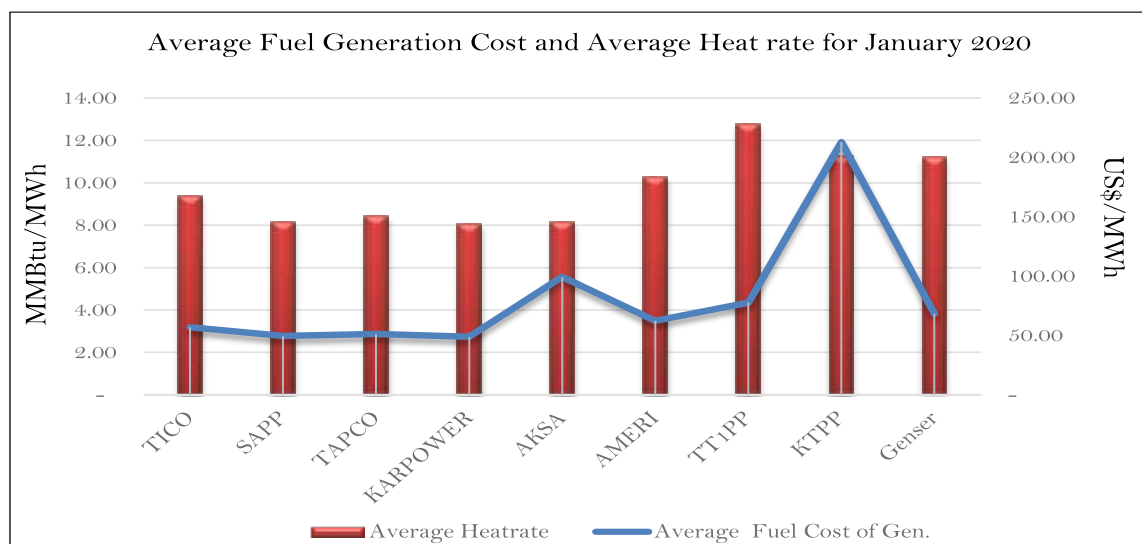
		Actual	Projected	Change
Average Market Energy Cost	US\$/MWh	74.96	59.95	15.01
Average Market Capacity Charge (AMCC)	US\$/MWh	38.47	40.60	(2.14)
Total Average Market Cost (TAC)	US\$/MWh	113.43	100.55	12.88
System Marginal Cost (SMC)	US\$/MWh	82.87	68.74	14.13
System Marginal Capacity Charge (SMCC)	US\$/MWh	23.95	23.95	-
Spot Market Price (SMP)	US\$/MWh	106.82	92.69	14.13
Composite Bulk Generation Charge (CBGC)	US\$/MWh	87.17	87.17	-
Deviation of TAC from CBGC	US\$/MWh	(26.26)	(13.38)	(12.88)
Deviation of SMP from CBGC	US\$/MWh	(19.65)	(5.52)	(14.13)



Average Fuel Prices		
		Jan-20
Fuel Type	Unit	Delivered Cost
Natural Gas	US\$/MMBtu	6.08
LCO	US\$/BBL	70.65
HFO	US\$/Tonne	428.90
DFO	US\$/Tonne	763.89



	Gazetted Natural Gas Price	Weighted average Natural Gas Price	LCO	HFO	DFO
US\$/MMBTu	6.08	5.97	13.35	12.18	18.91



ECONOMIC FACT SHEET

Power Plant	Capacity Utilization (%)	Average Heat rate (Btu/KWh)	Average Fuel Cost of Generation (US\$/MWh)	Emission Factor (kgCO ₂ /kWh)
Akosombo	65.61	-	-	-
Kpong	53.26	-	-	-
Bui	27.33	-	-	-
SAPP	36.00	8,139.37	49.49	0.43
TAPCO	36.60	8,425.31	51.23	0.45
TICO	39.11	9,379.16	57.03	0.50
TT1PP	40.79	12,776.54	77.68	0.68
CENIT	48.43	11,156.50	67.83	0.59
TT2PP	8.38	12,905.83	78.47	0.68
KARPOWER	72.14	8,034.20	48.85	-
AMERI	72.51	10,272.41	62.46	0.55
TROJAN	-	-	-	-
KTPP	4.94	11,257.98	212.89	0.60
AKSA	34.97	8,158.96	99.35	0.64
Genser	55.09	11,223.74	68.24	0.60

Other Market News and Trends

1. The 2020 Electricity Supply Plan (ESP)

The Electricity Supply Plan (ESP) is an annual publication by the Ghana Company (GRIDCo) that involves key stakeholders in the Electricity Supply Industry (ESI). The ESP is developed by the Electricity Supply Plant Committee, which is made up of GRIDCo, Energy Commission, Volta River Authority (VRA), Bui Power Authority (BPA), Electricity Company of Ghana (ECG), Northern Electricity Development Company (NEDCo) and Ghana National Petroleum Corporation (GNPC).

The 2020 ESP provides an outlook of electricity demand and supply for 2020. It also contains information on the performance of Ghana's power system performance in 2019, the 2020 demand forecast and the outlook for power supply, taking into consideration all the existing sources of generation as well as ongoing projects. The document goes further to assess the available hydro generation capacities, considering the water level of the reservoir for both Akosombo and the Bui dam. Information on fuel requirements and the associated cost (estimated) for thermal generation needed to meet electricity demand in 2020 and evaluates the associated evacuation requirements to ensure reliable power supply.

The 2020 ESP, further highlights the potential challenges to electricity service delivery in Ghana in 2020 and makes recommendations for actions to be taken to mitigate the potential challenges and ensure reliable power supply in 2020.

The subsequent editions of the Market Bulletin in 2020 will make reference and comparison of actuals with the projections of the 2020 ESP.

1.2 Demand and Supply outlook for 2020

Electricity demand grew by 11% in 2019 against the projected 5.5% in the 2019 ESP. Also, electricity consumption grew by 12.1% against the projected 8% in the 2019 ESP. However, Ghana's Peak Demand and Consumption for 2020 has been projected to increase by 11% and 9.5% respectively in the 2020 ESP due to the following reasons.

- Demand increases attributable to ongoing distribution network expansion works intended to extend coverage and improve service quality to ECG and NEDCo customers;
- Expected completion and commissioning of various ongoing rural electrification projects within the ECG and NEDCo distribution zones in 2020;
- Increased VALCO demand due to the ramp-up to full operation of the second potline, increasing the smelter's demand from the current 55 MW to 150 MW. Please note that since the startup of the second potline in June 2018 the smelter has encountered a series of internal challenges such that they have not yet been able to attain full potline operation;
- Increased exports to SONABEL (Burkina) from an average of 60 MW in 2019 to a planned maximum of 150 MW in 2020;
- Increased exports to CEB (Togo/Benin) from an average of 120 MW in 2019 to a planned maximum of 180 MW in 2020;
- Re-operationalisation of the AngloGold Ashanti mine at Obuasi

Table 1: 2020 Demand and Supply Balance (Gwh)

Customer Category	Demand/Supply
Demand	
Domestic Consumption	16,439.10
VALCO	1,232.00
Export (CEB+SONABEL+CIE)	1,652.00
Projected Energy Consumption	19,323.10
Sources of Supply	
Akosombo	4,646.00
ƙpong GS	820.00
TAPCO	1,414.00
TTCO	1,968.00
TT1PP	97.00
KTTP	237.00
TT2PP	5.00
VRA Solar	3.10
Imports From Cote d'Ivoire	-
Total VRA Generation	9,190.10
Bui GS	762.00
SAPP 161	560.00
SAPP 330	2,198.00
CENT	363.00
AMERI Power Plant	1,291.00
Karpower Barge	2,975.00
AKSA	157.00
CENPOWER	898.00
AMANDI	881.00
Early Power	-
BxC Solar	24.00
Meinergy	24.00
Safi Sana	-
Total IPP Generation	10,133.00

The Electricity Supply Plan for 2020 projected a total of 19,323.1 GWh to meet total export and domestic demand for 2020. Out of the total electricity projected to be supplied in 2020, 16,323.1 GWh will be consumed domestically and 1,652.1 GWh will be exported to CIE, CEB, and SONABEL. There is no scheduled electricity import for 2020 due to sufficient domestic generation to meet demand.

Other Market News and Trends

Out of the total installed capacity of 5,083 MW, the dependable capacity for 2020 is estimated to be 4,743 MW, due to planned maintenance and fuel supply challenges. However, monthly available capacity is expected to range between 3,204 MW and 4,208 MW. The monthly System Peak Load is expected to range between 2,872 MW and 3,115 MW. The System Peak Load for 2020 is projected to be 3,115 MW in December. The system is projected to have possible imbalances in February 2020, due to the WAGPCo intelligent pigging exercise. The system reserve margin for February 2020 is estimated to be 7%, which is 11% lower than the required system reserve margin. Electricity generation from hydro sources is projected to contribute an average of 38.8% of the System Peak Load (monthly) for 2020 while thermal generation accounts for the rest.

Table 2: monthly demand and supply projection for 2020

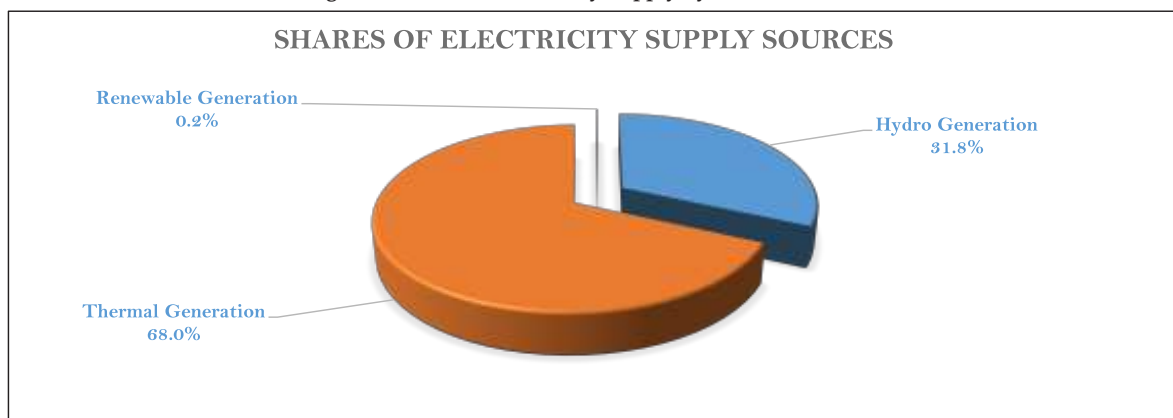
Customer Category	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Demand												
Total System Demand (MW)	2,919.00	2,987.00	3,064.00	3,093.00	3,054.00	3,019.00	2,894.00	2,912.00	2,872.00	3,056.00	3,074.00	3,115.00
Demand for Export (MW)	330.00	330.00	330.00	330.00	330.00	320.00	320.00	320.00	320.00	320.00	330.00	330.00
Domestic Demand (MW)	2,589.00	2,657.00	2,734.00	2,763.00	2,724.00	2,699.00	2,574.00	2,592.00	2,552.00	2,736.00	2,744.00	2,785.00
Available Generation Capacity (MW)	3,394.00	3,204.00	3,879.00	4,180.00	4,180.00	4,180.00	4,208.00	3,968.00	3,848.00	4,118.00	4,238.00	4,158.00
Import (MW)	-	-	-	-	-	-	-	-	-	-	-	-
Total Generation Capacity with Import (MW)	3,394.00	3,204.00	3,879.00	4,180.00	4,180.00	4,180.00	4,208.00	3,968.00	3,848.00	4,118.00	4,238.00	4,158.00
Surplus/deficit with Import (MW)	475.00	217.00	815.00	1,087.00	1,126.00	1,161.00	1,314.00	1,056.00	976.00	1,062.00	1,164.00	1,043.00
Surplus/deficit without Import (MW)*	475.00	217.00	815.00	1,087.00	1,126.00	1,161.00	1,314.00	1,056.00	976.00	1,062.00	1,164.00	1,043.00
Reserve with Import	16%	7%	27%	35%	37%	38%	45%	36%	34%	35%	38%	33%
Reserve without Import*	16%	7%	27%	35%	37%	38%	45%	36%	34%	35%	38%	33%
Supply												
Total Electricity Supply (GWh)	1,618.00	1,566.00	1,725.00	1,675.00	1,686.00	1,573.00	1,563.00	1,558.00	1,539.00	1,651.00	1,680.00	1,759.00
Domestic Supply (GWh)	1,618.00	1,566.00	1,725.00	1,675.00	1,686.00	1,573.00	1,563.00	1,558.00	1,539.00	1,651.00	1,680.00	1,759.00
Export (GWh)	158.00	157.00	160.00	133.00	137.00	132.00	127.00	114.00	112.00	129.00	134.00	159.00
Domestic Consumption (GWh)*	1,545.63	1,495.97	1,647.86	1,600.07	1,610.61	1,502.65	1,493.11	1,488.31	1,470.19	1,577.16	1,604.89	1,680.33

*Author's analysis based on projected figures
Domestic consumption excludes network usage and losses.

Shares of electricity supply

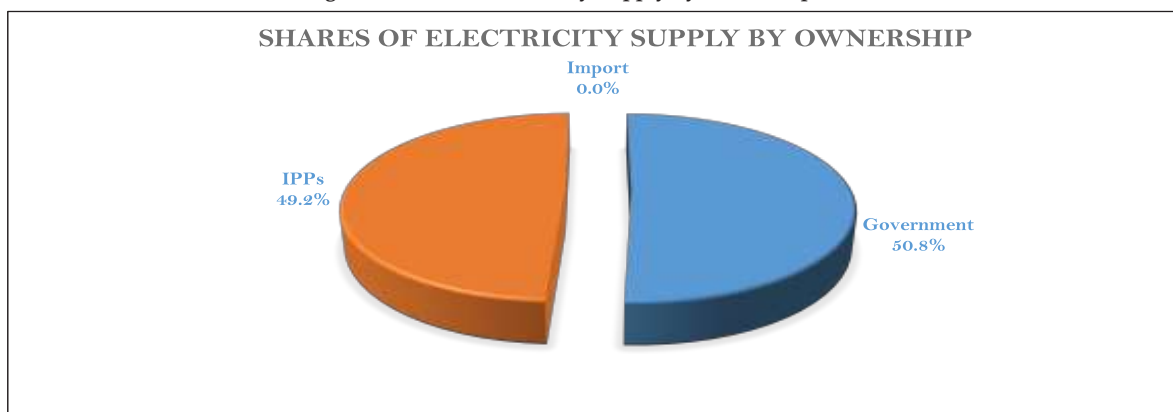
Electricity generation from hydro sources is projected to contribute 31.8% of the total electricity to be supplied in 2020. However, electricity generation from thermal sources is projected to account for 68% of the total electricity to be supplied in 2020. Lastly, renewable energy generation is projected to account for the remaining 0.2% of the total electricity to be supplied in 2020.

Figure 1.0 Shares of Electricity Supply by the source in 2020



Electricity generation from the Government-owned utilities is projected to contribute 50.8% of the total electricity to be supplied in 2020, which was lower than the 67.4% recorded in 2019. The IPPs have been projected to supply the remaining 49.2% of the total electricity projected to be supplied in 2020, which was higher than the 32% recorded in 2019.

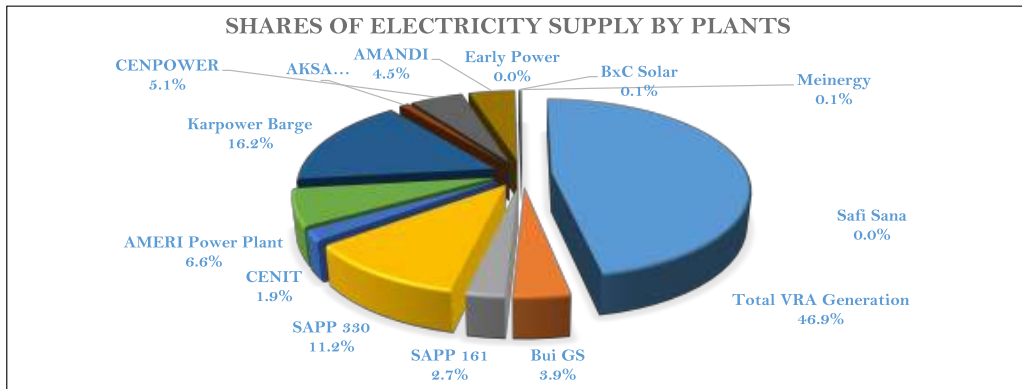
Figure 2.0 Share of Electricity Supply by Ownership in 2020



Other Market News and Trends

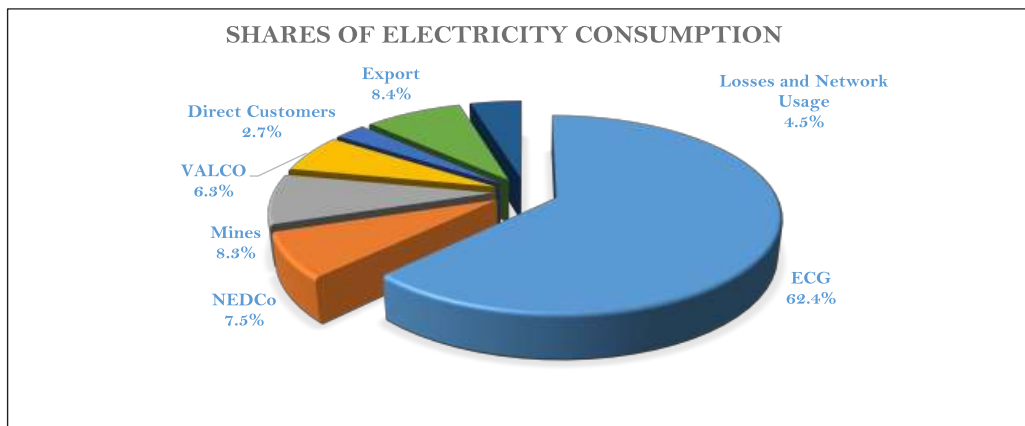
Electricity generation from VRA is projected to dominate the total electricity to be supplied in 2020 with a share of 46.9%. This will be followed by Karpowership, SAPP, Ameri, and CenPower in the order of 16.2%, 13.9%, 6.6%, and 5.1% respectively. The Amandi power plant is expected to commence commercial operation in 2020 and contribute 4.5% of the total electricity to be supplied in 2020. The Bui GS has been projected to contribute 3.9% of the total electricity to be supplied in 2020.

Figure 3.0 Shares of Electricity Supply by plants in 2020



The total electricity consumption by ECG is projected to constitute 62.4% of the total electricity consumption for 2020. The share of the projected total export is expected to contribute 8.4% of the total electricity projected to be consumed in 2020. Electricity consumption by the mining companies is projected to account for 8.3% of the total electricity consumption for 2020. The share of the total electricity consumption for NEDCo is projected to account for 7.5% of the total electricity consumption for 2020. This will be followed by VALCO, Losses and Network usage, and Direct Customers in the order, 6.3%, 4.5%, and 2.7% respectively.

Figure 4.0 Shares of electricity consumption for 2020.



Acronyms

AGPP = Atuabu Gas Processing Plant	Btu = British Thermal Units
CBGC = Composite Bulk Generation Charge	CUF = Capacity Utilization Factor
DFO = Distillate Fuel Oil	EC = Energy Commission
ECG = Electricity Company of Ghana	EMOP = Electricity Market Oversight Panel
ESP = Electricity Supply Plan	FPSO = Floating Production, Storage and Offloading
GHP = Ghana Pesewa	GNGC = Ghana National Gas Company
GWh = Giga-watt Hours	HFO = Heavy Fuel Oil
KTPP = Kpone Thermal Power Plant	kWh = Kilo-watt hours
MRP = Mine Reserve Plant	LEAP = Long-range Energy Alternative Planning
LCO = Light Crude Oil	LI = Legislative Instrument
LTA = Long Term Average	MW = Megawatt
MMscf = Million Standard Cubic Feet	MWh = Mega-watt hours
NITS = National Interconnected Transmission System	PV = Photovoltaic
SAPP = Sunon Asogli Power Plant	SMP = System Marginal Price
SNEP = Strategic National Energy Plan	TEN = Tweneboa, Enyenra, Ntomme
TT2PP = Tema Thermal 2 Power Plant	TT2PP = Tema Thermal 2 Power Plant
VRA = Volta River Authority	WAGPCo = West African Gas Pipeline Company
WAGP = West African Gas Pipeline	WEM = Wholesale Electricity Market

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